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EARLY FLYING EXPERIENCES

by

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(Ed. Note: The author of this paper, during the early period of aviation growth, carried the generally recognized distinction of being one of the world's foremost aviators.)

One morning in late April 1911, I stepped off a train in Dayton, Ohio. I was there under War Department orders detailing me to aeronautical duty with the Signal Corps, and directing me to report at Dayton for the purpose of undergoing instruction in operating the Wright aeroplane. One other officer was listed on this same order, — Second Lieutenant Henry H. Arnold, 29th Infantry, with whom I was to fly and serve for many years and who, later, was to so brilliantly command the United States Army Air Forces in the late World War.

I realized that I was entering upon a career of unknown proportions but one which, I felt, provided I remain alive, would not only prove most interesting but, also, rewarding in the professional military field. I was not disappointed, — I served continuously through every phase of the "ups and downs" of the Air Arm for twenty-two years until forced to retire through physical disability as a result of tuberculosis.

Although, during the fall maneuvers of 1909 in the vicinity of Omaha, Nebraska, I had seen the first Signal Corps airship in flight under the control of Lieutenant Frank P. Lahm, a balloonist of note and winner of the first Gordon Bennett Balloon Race on September 30, 1906, I had not seen an airplane in flight. The nearest approach to an airplane that I had seen was at Fort Leavenworth in the fall of 1910. I had ridden to the polo field for practice, and when I arrived I observed a machine running madly back and forth the length of the field, but showing neither ability nor desire to leave the ground. I was not impressed nor particularly interested in this

performance, which I later regretted; — several successful airplane builders and pilots started with this type of underpowered air vehicle.

At the time of my assignment to the Signal Corps for pilot training I was on duty at Fort Leavenworth with the 15th Cavalry, serving as a Second Lieutenant in H. Troop of the Second Squadron. This was my initial assignment following my graduation from the United States Military Academy at West Point in June, 1909.

Life at Fort Leavenworth during these years was like the "calm before the storm." Even though the World War was in the offing, the "Old Army" predominated with its drills, exercises, practice marches, parades and inspections with all of the accompanying "spit and polish." But in the Bachelor Messes, — and there were many bachelors — (one did not marry unless he was personally able to support a wife), there was some discussion of flying machines and their probable use in war. We knew, in general, of the flights made by Orville Wright at Fort Myer, Virginia, in the summer of 1908 to meet the specifications issued by the War Department for the purchase of an airplane. We had read of the crash that resulted in the death of Lieutenant Thomas E. Selfridge, the first person to be killed in an airplane accident, and the serious injuries suffered by Orville Wright which delayed the completion of tests until the summer of 1909. When, in that year, the tests proved successful, it resulted in the purchase of an airplane by this country for military purposes, — the first acquired by any nation in the world. Following these tests there was a burst of flying activity which saw Wilbur Wright make a flight from Governor's Island up the Hudson to Grant's Tomb and return, and Glenn H. Curtiss make his record flight of one hundred and forty-two and one-half miles from Albany to Governor's Island in two hours and fifty minutes. Meantime, Wright and Curtiss exhibition teams had taken to the air and were giving flying exhibitions in the principal cities, where thousands of people were being finally convinced that man could fly.

But things were not going so well in the Army. As the year 1910 had drawn to a close the outlook for army aviation was gloomy indeed; the entire "air service," stationed at Fort Sam Houston, Texas, consisted of the one Wright airplane purchased the previous year and a detachment of nine enlisted men of the Signal Corps with Lieutenant Benny Foulois as sole pilot and Commanding Officer. To keep this small unit alive, Foulois at times found it necessary to provide personal funds for critical maintenance and repairs. This, despite the fact that when Congress established the Signal Corps as a Bureau of the War Department in 1890, it was assigned the duty and responsibility of providing aeronautic facilities for the Army.

In the meantime Europe had forged ahead in all phases of flying with such rapidity that Congress finally called for an investigation and, as a result, appropriated $150,000.00 for the fiscal year 1912, of which $25,000.00 was to be made available on March 3, 1911. This appropriation marked the real beginning of progress in military aviation; it provided the money for establishing the first Signal Corps Aviation School, and for the purchase of a few airplanes. The Chief Signal Officer, Brigadier General James Allen, immediately placed orders for five airplanes, all of the "pusher type," having the propellers in the rear. Two Wright B's were to be furnished by the Wright Company at Dayton, Ohio; one Wright B by the celebrated yacht designer, W. Starling Burgess, who had organized the Burgess-Curtiss Company at Marblehead, Massachusetts and was operating under license of the Wright Company; and two by the Curtiss Company at Hammondsport, New York. The Curtiss planes and one Wright B were to be delivered to Fort Sam Houston, Texas, and the other two to College Park, Maryland.

The selection of an aviation school site was not difficult: College Park, Maryland, a small village near Washington, on the Baltimore Highway and the Baltimore and

Ohio Railroad, was the logical choice. A small field had been used during the fall of 1909 by Wilbur Wright in teaching Lieutenants F. E. Humphreys, F. P. Lahm, and B. D. Foulois to pilot the Wright airplane. For the school site an additional two hundred acres was included, affording a maximum runway of approximately 2300 feet in an east-west direction.

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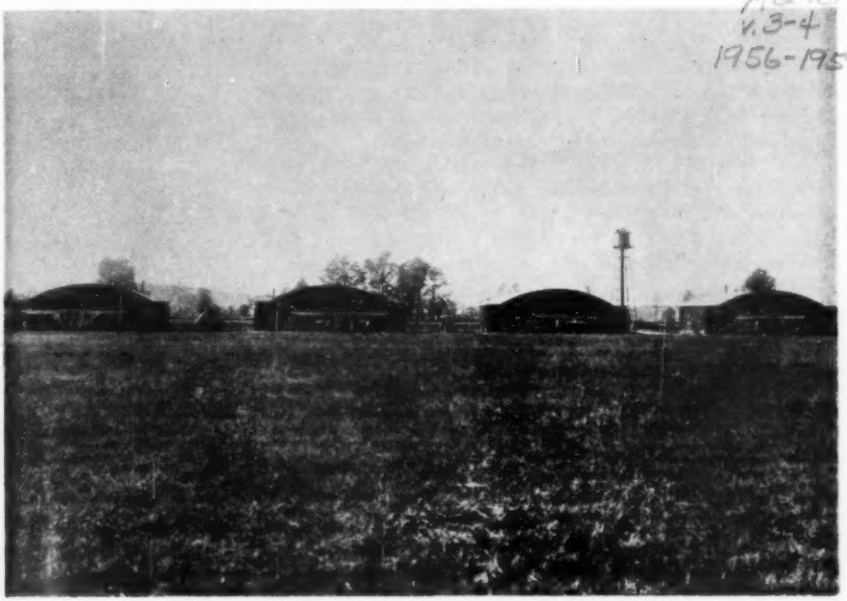


College Park, Md., 1911 Showing Airplanes and Hangars

With the airplanes ordered and the school site selected, the next problem was the selection and detail of the first officer students who would, on completion of their flight training, become instructors. Since the Wright and Curtiss planes were operated by different types of controls, it was necessary that some be trained by the Wrights at Dayton and the others by Glenn Curtiss at North Island, near San Diego, California. Lieutenants Paul W. Beck, Signal Corps, John C. Walker, 8th Infantry, and G. E. M. Kelly, 30th Infantry, were assigned for instruction in the Curtiss airplane. On completion of their training in the spring of 1911, they were ordered to duty with the Flying Detachment at Fort Sam Houston. For Wright training, Lieutenants Roy C. Kirtland, 14th Infantry, Henry H. Arnold, 29th Infantry, and Thomas DeWitt Milling, 15th Cavalry were selected. Roy Kirtland was ordered to Washington and placed in charge of the College Park School project, his flying training to be delayed until the school was established and in operation. Arnold and Milling were ordered to Dayton.

At the Wright factory, which had been recently built on the outskirts of the city, I was given a warm welcome by Orville Wright and Frank Russell, the first manager of the Wright Company. Frank had supervised the building of the factory, the first ever designed in the country, and had been in charge of the transfer of machinery and equipment to the new plant. Formerly the engines had been made in an old bicycle shop in Dayton and the planes had been assembled in an automobile factory in which floor space had been rented for that purpose. He was one of the non-flying

pioneers in aviation. Having seen one of Wilbur Wright's early exhibition flights, he left a position as president of a highly successful business to enter upon a career in the aviation industry that was to continue until his retirement in the thirties. His contribution to the growth of the industry was of inestimable value to both military and civilian aviation.

At the factory were also assembled the flying instructors, Al Welch and Cliff Turpin, and all of the men receiving flying training, both military and civilian. The military consisted of Arnold, myself and Lieutenant John Rodgers of the Navy, — the first naval officer to learn to fly a Wright airplane. The civilian group comprised Calbraith Rodgers, a cousin of John, Oscar Brindley, Howard Gill, and Leonard Bonney. Rodgers, later that year, made the first transcontinental flight from New York to Pasadena, California; due to excessive delays in repairs, this flight took forty-nine days to complete. Brindley later became a flying instructor for the Army; Gill flew mainly for sport; and Bonney joined up with the Wright flying team. With the exception of Arnold, Turpin and myself, all were later killed in airplane accidents. Within a few weeks we were joined by Harry Atwood who made a number of record breaking cross-country flights before the year had ended.

I soon found out that more was required in learning to fly an airplane than the mere manipulation of the controls of the plane in the air. Assigned as my instructor was Cliff Turpin who was to give me my preliminary flying lessons leading to solo flying. He took me back in the factory and outlined a course of work to be followed for several days before flying lessons could begin. I studied the construction and maintenance of the airplane and motor, then learned to assemble the motor and operate it.

To obtain practice on the ground in the use of the warping lever control, an old plane without landing gear or tail assembly was balanced on a sawhorse and mounted in the same position as that of a plane in the air. The warping lever was connected by control wires running to a movable block which was mounted on the right wing tip in the manner of a moving belt running over a pulley. A backward pull would lift the left wing while a forward motion would reverse the action. This produced an action similar to that which would be experienced when the warping lever was used in actual flight. I assiduously practiced with this warping lever and it repaid me when I started my instruction in the air.

At that time each type of airplane, foreign and domestic, had its own individual method of control, the Wright, I believe, being the most difficult for the student since the lateral balance was not obtained through natural movement of the hands or body. To climb or descend, however, was natural as the elevator was operated by an upright stick which reacted naturally to a forward or backward motion.

On boarding the plane one climbed between two cross wires running from the upper to the lower plane between the struts. He sat on one of two hard seats mounted side by side on the leading edge of the lower plane where a footrest was provided by a bar mounted in front of the wing. The four cylinder motor was secured to the lower plane, just adjoining the right seat. Its speed was controlled by advancing and retarding the magneto with a wire control leading from a foot pedal on the footrest. A rachet mounted alongside of the footrest would hold the pedal in place when the magneto was retarded. While flying full speed the pedal was allowed to come all the way back so that the toe could be removed. To stop the motor it was necessary to release the cylinder pressure by opening the valves located on the top of each cylinder. A cam control was installed for this purpose. From the cam lever a string was attached to the two struts over the head of the pilot. This string was pulled when it was desired to stop the engine.

The flying controls consisted of the warping lever with an extension on top which was hinged to rock laterally for operating the vertical rudder. The rudder control could be operated independently or in combination with the warping lever. A vertical stick, operating in the conventional manner, operated the elevator. Two were provided, — one outside of each seat.

Finally, on May 2nd, I was given my initial flight in an airplane by Al Welch. It was not, however, until May 6th that I took my first lesson with Cliff Turpin who was my assigned instructor, in which I rode as a passenger. The Wrights did not fly on Sunday, so that my lessons really began on Monday, May 8th. From Monday through Friday I was given 15 flights for a total time of two hours and one minute. I was then sent up for my first solo. Orville Wright was present to observe my first solo flight. He was sufficiently impressed with the rapidity of my progress and the fact that I had made my first landing after spiraling from an altitude of 600 feet, that he flew with and gave me personal instruction many times thereafter, during the remainder of my stay. I have always felt that it was the instruction I received from Orville Wright that carried me through my flying career without being killed.

After our solo flights Arnold and I conducted our practice flights daily. But all was not work. We had the good fortune to be repeatedly entertained by the Wrights at their home on Hawthorne Street. This was usually on Sunday nights when we would be invited to supper and were served the best meals we had ever eaten. After supper, Bishop Wright, the father, Orville, Wilbur and all the guests would sit around the living room and hear of how the Wright Brothers started as boys and continued with their efforts until they actually flew their first airplane. The Wrights' house, as well as the bicycle shop is now preserved in the village of the Ford Museum in Dearborn, Michigan.

The middle of June we were ordered to College Park. Here we found the field in shape and the necessary buildings and hangars erected, — but no airplanes. The first plane arrived and was put in readiness for flight on July 1st. The personnel complement of the base included Captain Charles F. Chandler, Commanding Officer, Lieutenant John P. Kelly, Medical Officer, Henry Mollineau, supervisor of technical repairs, and 15 Signal Corps specialists.

Our first school activity was to teach Chandler and Kirtland to fly. Since both Arnold and I flew from the left seat, using the warping lever with the right hand, it was necessary that both Chandler and Kirtland be trained to fly from the right seat and operate the warping lever with the left hand. Later this limitation was removed by equipping the airplane with dual controls.

Within a few days after the arrival of the Wright plane, the Burgess-Wright B was received. Starling Burgess, who was a great yacht designer, came along to pilot the plane on its official tests, — I was ordered to go as passenger and official observer. We had only been up a few minutes when, while flying at a height of about 60 feet with me watching the controls, I suddenly sensed a slackening of speed. I turned quickly to Burgess and asked him to put the machine into a glide. Unfortunately he was too late and we went into a stall, slid off on the right wing, which was crushed as we hit the ground. The crushing of the wing absorbed much of the shock and we escaped with only minor cuts from the brace wires. The machine was returned to the factory, — rebuilt, and about a month later was again tested and accepted.

Since living facilities did not exist at College Park for the officers, we were forced to live in Washington and make our trips to the field by train, of which there were several daily, by streetcar or by automobile, — if one were able to own such a luxury at that time. After flying became routine we usually limited the instruction

to the afternoon, as we were all assigned to additional duty in the office of the Chief of Signal Corps. Here Captain Chandler, in addition to being Commanding Officer at College Park, was also in charge of aviation in the Headquarters of the Signal Corps. About this time, Captain Beck arrived from San Antonio, which added a third plane to our flight line.

We had no Army specifications for a flying test to qualify our officer students after they began to fly alone. We, therefore, adopted the test prescribed by the Federation Aeronautique Internationale, whose headquarters was in Paris, France. Aero Clubs in various countries throughout the world acted as its representatives. The Aero Club of Washington, acting in this capacity, designated an official for qualifying aviators in this country. This rating of "Aviator" was much prized throughout the world and recognition was given by the fraternity to anyone possessing it. Arnold and I took our tests the first part of July and were issued our Aviator's Certificates on 19 July. Had we known, we could have taken these tests much earlier while still at Dayton. An Expert Aviator's Certificate was issued the following year and in September I received Certificate No. 3 and Arnold was issued Certificate No. 4.

As may well be imagined, flying at this period was quite a novelty. Large crowds visited the school to see and applaud the flying, and the papers gave any flying feat great publicity. Naturally, there could not be sensational flights every day, but the papers were more than willing to let their imagination run wild in writing the stories. The headlines in the papers at that time very convincingly reflected this attitude. Such headlines as: "NEAR DEATH — LIEUT. ARNOLD NUMBED BY COLD AT HIGH ALTITUDE — MAKES NEW RECORD AND NEARLY LOSES CONTROL OF MACHINE WHILE 4,000 FEET IN THE AIR;" — "STRENGTH OF WILLPOWER SAVES A COLLEGE PARK AVIATOR FROM BEING DASHED TO EARTH." Any flight of a few miles was a cross-country. Any flight that broke a little from pattern was highly publicized. As a sample, on one occasion, with Lieutenant Kirtland as passenger, I made a 35-mile cross-country flight from College Park; then landed, and took off from the limited space of the parade ground at Washington Barracks (the present Ft. McNair, site of the National War College); the feat was duly publicized in the press. With these early planes it was always necessary to be ready for a motor failure, — it might stop at any time. It was equally important to keep in mind that the difference between high speed and stalling was only about 8 miles. Consequently, if the motor should stop, one had to be very alert in reaction to effect a landing without stalling the machine. An illustration of this: — I had just taken off one day and was headed toward the end of the field at an altitude of about 20 feet when the connecting rod broke and began punching through the cylinder wall. Immediately ahead of me at the end of the field was a growth of small trees about 20 feet high. While I immediately cut off the motor, it was not possible to turn back into the field without stalling and crashing the plane. It left me only one course open which was to continue straight ahead and do the best that I could with the trees. By pulling up and stalling into the trees, I did little damage. Weighing only about 750 pounds we were able, with long poles, to lift the machine and carry it back to the field without further damage. The rule we established then to continue straight ahead when speed and altitude would not permit turning without a resultant stall, is equally applicable today.

In addition to flying training we naturally were interested in the military use of the plane and were continuously trying to determine what could be done with it in a military way. We carried out reconnaissance flights and, with a commercial camera, took many pictures from the air. At about this time we had the good fortune to be approached by a man named Riley Scott who was a graduate of West Point and had

spent a few years in the Army, and then resigned. He had designed a bombsight and was very anxious to have it tested. We, of course, were only too glad to carry out the flying tests. Unfortunately, he was a large man, over six feet in height and 200 pounds in weight. With the bombsight weighing 20 pounds and an appropriate bomb being in the order of 25 pounds, the tests produced a very heavy load for our underpowered planes. As I was the lightest pilot on the field I was assigned to the pilot duty for these tests. Modifying the airplane to make maneuvering space for Mr. Scott, his bombsight and bomb was a major undertaking, but it served a worthy cause. By using every "trick of the trade" I was able to get the plane to a height of 600 feet for the bombing tests. The tests were unusually good and resulted in great interest throughout the armed forces of all countries, particularly of France and Germany, as to the applicability and effectiveness of aerial bombing. Certainly the last two wars have more than justified the logic of the interest which they showed at this initial bombing exercise.

The next year, in the summer of 1912, France which, at that time, was the leading nation in aviation, both private and military, held a large aviation meet in which Michelin donated a large sum of money to give as prizes for the best bombsight, the most accurate bombsight, and the sight that scored the greatest number of hits within a prescribed target. It is interesting to note that all three were won by Riley Scott; no other sight was produced that could even compare with it. I merely mention this to stress the fact that in the early days of aviation in this country we were consistently first in developing a military use for the airplane while being consistently last in utilizing these capabilities. This result was directly attributable to a lack of official support and money.

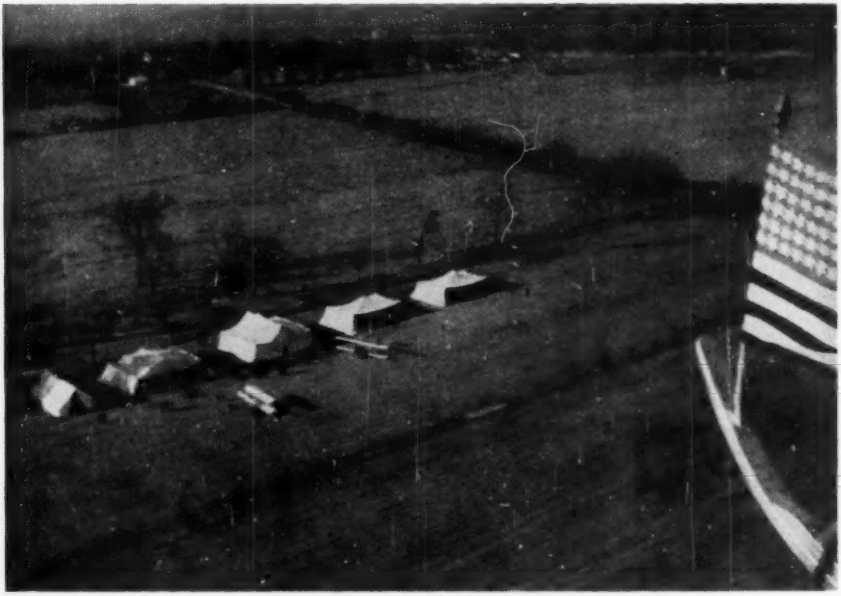
It was the intention of the War Department, at this time, to teach officers in both the Wright and Curtiss airplanes, — particularly it was desired to keep at least two manufacturers in business. This gave rise to a rather cumbersome problem as the control systems differed to a major degree, which required that pilots develop separate aptitudes and techniques for each plane. After examining the Curtiss plane thoroughly I decided that to learn to fly it would not be too difficult. I began by using the "grass-cutter" which was equipped with Curtiss controls, but without sufficient power for actual flight. When I had become sufficiently familiar with the control set-up I moved on up to the Curtiss plane. During the following year I flew this Curtiss plane in the Army maneuvers at Bridgeport, Connecticut.

In August I was ordered to Marblehead, Massachusetts to visit the Burgess-Curtiss factory on an inspection trip. While there, on September 1st, the Boston Aviation Meet at Squantam Field was inaugurated. Large prizes were available and the Meet took on an international character. Aviators from England, France, and the United States participated. One well-known British designer came with a Wright B equipped with a LeRohne motor. This engine gave him additional power and speed over the standard Wright B with its four cylinder motor. I was asked by Mr. Burgess and Mr. Curtiss to enter this meet as pilot of their B-type Wright. I immediately wired the War Department for authority and leave for this event, which was approved. It was felt that if Army aviators competed with civilians it would make the public appreciate that progress was being made in military aviation. I was very fortunate in scoring high in these events. I entered such tests as spot landings, figure eights, message pick-ups, and a Tri-State cross-country race. On the figure eight test I very nearly lost my life. A brisk wind was blowing and the course was with and against the wind. On one flight, going with the wind, I banked too steeply and a sudden gust threw me into a vertical position where the plane began to teeter as if it were going all the way over on its back. I reversed the turn using my left hand to pull the elevator while putting my foot on the warping lever and pressing forward

as far as I could. The vertical rudder held the plane up while it was returned to level flight, — but I am still not sure as to how it occurred.

The biggest event was the Tri-State race, divided into two classes, monoplanes and biplanes, due to the fact that the monoplane was much faster. While there were many entrants only four planes started, Ovington and Stone flying the monoplane class with Atwood and myself flying a B-Wright. The course included three intermediate landings, at Nassau, New Hampshire, Worcester, Massachusetts, Providence, Rhode Island, and back to Boston. Stone and Atwood landed in Medford, a short distance from Boston, and gave up the flight. Ovington and I, therefore, became the sole contestants in each class. We finished the flight and came up winners. It was a gruelling experience that used up the daylight hours and forced me to land back at Boston after dark. Early on my last lap darkness overtook me and only through flares being shot up from the home field was I able to locate it. The automobiles at the field, by turning on their headlights, gave me enough vision to make a safe landing.

Flying soon became one of the main attractions at Fairs and any other kind of public celebration. It was a novelty and pilots and planes were few and far between. After the favorable reaction to my participation in the Meet at Boston, Captain Beck, Arnold and myself were engaged to fly at numerous New England towns. This was, of course, with time being taken on leave status. They all followed the usual pattern, —



Augusta in Good Flying Weather

message pick-ups, accurate landings, simulated bombings with oranges and bags of white powder, maneuvers, and performance tests. In these aerial meets setting new records became the order of the day; experiencing new thrills became a routine occurrence. I got my ample share of both.

After the Meets we settled down to regular training at College Park. Having made a successful night landing at Boston, I particularly wanted to continue the practice at College Park. I was fortunate to find that a friend of mine, Oliver Conover was agent for searchlights for which the gas was made from carbon and water. He furnished four of these searchlights for tests and they proved to be highly adequate for successful night landings.

In the late fall it was concluded that the winter weather in Washington would not be suitable for training. It was, therefore, decided to move the school to Augusta, Georgia. We left College Park for Augusta on 28 November and started flying on 7 December. As it was not feasible to construct buildings for the airplanes, we

Augusta Under Flood

designed "T" shaped tent hangars to house the airplane and protect it from the weather. The airplanes could not be exposed to the weather as they were made of fabric and wood which would deteriorate rapidly if left in the open during inclement weather. We suffered severely from this type of weather; in January a heavy snow settled on the tent hangars which threatened to collapse; again in February, flying was stopped by another big storm and flood which completely swamped the hangars and the flying field. The planes were lifted and placed on wooden horses to keep them free from the flood waters. It was, all in all, not a very good selection as a site for winter flying with the aircraft of that time.

After summing up the accomplishments of winter flying at Augusta it was found that in spite of the storms, winds and rains, which flooded the flying field for several days, much instruction had been carried out, — more than 436 flights of 81 hours duration had been made.

Both at College Park and Augusta we were frequently visited by Orville and Wilbur Wright, who kept in touch with the work and were most helpful in every respect.

At the beginning of 1912 the Signal Corps placed orders for five new airplanes under the general requirements that they would have higher motor power, be faster, and able to carry more weight. Four of the planes were "Scouts" (two-seaters) for reconnaissance, — two being Wright, one Curtiss, and one Burgess-Wright which was to be equipped with a Renault motor. The fifth plane was to be a Wright "Speed Scout" with a speed of 65 miles per hour.

The first of these airplanes, the Curtiss Scout, was delivered at Augusta in March but did not complete its test until it was returned to College Park in May. The first Wright Scout arrived at this same time. It was similar, in general, to the Wright B, but larger and stronger with a 50 horsepower engine, — the original B had been equipped with an engine of only 35 horsepower. Orville Wright came to College Park to be present for these tests which were flown by his pilot, A. L. Welch. Welch made 16 flights in the following two weeks, on nearly all of which he was accompanied by either an officer or soldier. On June 11th, late in the afternoon, Welch gave notice that he would conduct a speed test. I had started back to Washington by car and was carrying Lieutenant Hazelhurst with me. As we arrived at the gate Welch was nearby at the end of the runway waiting for a passenger who had not appeared. He ran over to the car and asked if we could wait long enough to allow Hazelhurst to be his passenger, — to which we agreed. On the second lap of the course in his turn, while flying at about 50 feet in altitude, he swerved and crashed into the ground, nose first, only a short distance from where I was waiting. Both occupants were killed. The machine was so badly broken up that it was impossible to determine whether a structural failure had been the cause or whether, in the turn he had nosed up, lost flying speed, and stalled. I always leaned to this as the cause. It has always been my opinion that the major contributing cause of the early crashes of these underpowered planes could be traced directly to stalls at low altitudes.

Since the beginning of College Park new students were progressively assigned for flying training. Four students were added to the roster at Augusta, — Lt. Colonel C. B. Wender and Lieutenant Winter of the National Guard, and Lieutenants Leighton Hazelhurst and Harry Graham of the Infantry. On our return to College Park nine more entries were added to the student roster. They were: Captain Hennessy and Lieutenants Rockwell, McLeary, Brereton, Park, Goodyear, McCall, Ellington and Sherman. The air arm was beginning to grow.

We, who were associated with aviation, felt that the airplane was capable of offensive use if properly designed and armed. Unfortunately the guns available in the Army were neither designed for nor suited to mounting on the airplanes we were flying. But in early June, I. L. Lewis, who had invented some famous guns, brought one to College Park that he thought would serve the purpose. Captain Chandler elected to test the gun and asked me to be his pilot.

The Lewis gun was air-cooled, weighed about 25 pounds, and fired standard Army ammunition which was loaded in circular drums mounted on top of the gun. It could be adjusted to fire at rates of three to seven hundred rounds per minute. We tested it at a rate of about 500. Our firing tests against ground targets proved that the gun could be easily operated and was about as accurate as could be expected. We were very impressed and anxious to get some of these guns to continue our training and tests. A request was made for the purchase of ten of these guns. The Signal Corps approved, but the Chief of Ordnance was against the purchase and insisted that we should use only guns then supplied by the Ordnance Department. The inventor, Lewis, was forced to go to Belgium to manufacture his guns and, after we entered the War in 1917 we found it necessary to purchase these same guns from him to equip our planes.

This short-sightedness was one of the major reasons why we had neither combat aircraft nor combat crews in our military structure at the beginning of World War I.

The War Department was, however, much more receptive to the use of the airplane for observation and reconnaissance missions. We began these actual field tests in Army maneuvers held in the vicinity of Bridgeport, Connecticut, from August 10th to the 17th in 1912. We sent one Burgess-Wright airplane, one Curtiss (single-seater), and one Curtiss (two-seater). The Wright plane was to be flown by Foulois and the Curtiss planes by Geiger and myself. From a military standpoint we were able to get information of value. Some expressions of the ground forces' staff officers support this observation. I quote a few: "The experience gained in these maneuvers proves conclusively that the airplane is the best possible method of obtaining information." "The information obtained by the aeroplane was much more rapidly obtained and much more accurate and full than that gathered by the Cavalry patrols on either side." "To be without an aviation squadron attached to a force when operating against one supplied with aeroplanes is to place an almost insurmountable handicap upon that force."

These results were achieved with planes that were underpowered and of very limited endurance. The communication equipment was the product of field improvisation. We were, however, successful in demonstrating one of the military values of an airplane.

Later Arnold and I conducted a series of tests at Ft. Riley, Kansas in aerial adjustment of Field Artillery. Arnold was equipped with radio while I used a drop message technique. Accurate observations proved easy to make but the drop message technique took too much time. The most successful method proved to be the use of radio from the plane.

It was during these tests that Arnold had a nerve-racking experience and a narrow escape from a serious crash. We had finished our work for the morning on the firing range and were preparing to fly back to the parade ground at the Fort. Arnold went on ahead and I followed a short time later. When I got over the field, one of the miniature whirlwinds which occur on sunshiny days in that country struck my plane and turned it more than 90 degrees. The plane stalled, but by diving it a short distance I regained speed and pulled it out for a safe landing. When I had landed I found everybody on the ground in an uproar. They told me that Arnold had had a narrow escape and that he and the bachelor friends, with whom he was staying, were at Headquarters celebrating the fact that he had not been killed. I joined them and found them gathered around a table imbibing champagne rather freely under the justification of his narrow escape. He told me that a whirlwind had stalled his plane causing it to fall away into a dive. Also, that he instinctively kept pulling back on the controls and that on the last pull his plane came out just inches above the ground and made a successful landing. While the urge to pull out of a stalling dive can be very impelling if the ground is near and rapidly approaching the best procedure for such a crisis was to push the elevators forward for as long as possible to regain speed and control, delaying the pull back for landing as long as possible. These were procedures Orville Wright had heavily stressed while we had been his students at Dayton. The shock, however, was so severe to Arnold's nerves and confidence that he temporarily quit flying. Fortunately he came back again in the First World War.

With the growth of the school at College Park it was becoming increasingly difficult to carry all of the school activities at that one center. Curtiss, who was conducting a school at North Island, San Diego, invited the Curtiss contingent to move there. This move was approved and the Curtiss pilots and planes were transferred to San Diego under command of Lieutenant Geiger. In December, McCall and Ellington

were ordered to Burgess-Curtiss at Marblehead for instruction. The winter weather here was not suitable and this detachment moved to West Palm Beach, Florida, where it remained until the school was established at Texas City. The planes used at the Palm Beach school were equipped with pontoons and were based on Lake Worth. At this same time a school was established in the Philippines for training selected applicants in that Department. Lieutenant Lahm was assigned to command this school on a TDY status from Ft. Wm. McKinley.

The central school at College Park returned to Augusta in the fall of 1912 and established itself on the same field it had used the previous year. As usual, we had unusual weather. A gale wind struck the field damaging hangars and doing major damage to one of the planes. The new Wright Scout plane, which was delivered at Augusta, was smashed up when the Wright pilot attempted a landing on plowed ground, — one of the tests required at that time. This plowed field landing test became increasingly unrealistic with each advance in weight and speed of airplanes. No active pilot of today has ever had to pass it. But up to this time it was necessary that the pilot who wanted to go on living keep in mind that his engine might stop at any time, and be prepared to meet it. This demanded alertness and skill at getting the airplane back onto the ground on other than ideal landing strips. It might be worthy of note that in the earlier periods of flying, when hazard was greatest, there was no incentive pay for flying. The first recognition of this extra hazard came in an appropriation bill dated 2 March 1913. This bill carried a 35% increase in pay for flying officers, but limited the number to 30 who could receive it. At the same time Congress refused to appropriate more than $125,000.00 for the air arm. This was the same amount that had been appropriated back in 1911 to get this new arm started.

On February 25th, 1913, orders were issued from the War Department that all personnel and equipment would move to Texas City, Texas as promptly as possible, reporting there for duty as part of the Second Division that was then being assembled because of our tense relations with Mexico. Two days were required to prepare the school for field service. The airplanes, parts, hangars, and equipment needed for field service were loaded on railroad cars and this special train was dispatched on August 28th with a personnel complement of 5 officers and 21 enlisted men.

This change of status from a flying school to a military field unit required training of a very different character. Realizing that we would be called upon to operate with the troops and, perhaps, under war conditions, the school features were dropped and the aviation personnel were organized into the First Provisional Squadron. Training took on different objectives. We began concentrating on cross-country orientation, reconnaissance missions with the troops on the ground, and landings and take-offs on difficult terrain.

Back at Augusta I had qualified myself on the Burgess tractor. This plane was very superior to anything we had received up to that time. The 70 h.p. French Renault motor proved itself much more reliable than American types. This plane had performed so well that, while we were in field training at Texas City, I elected to give it a cross-country test by flying to San Antonio and return, — a distance of 224 miles. I took Lieutenant Wm. C. Sherman along as passenger. We left Texas City in the early afternoon on March 28th with an east wind of 25 miles per hour. The flight was made without trouble except that it was extremely rough, hazy, and poor visibility. My visibility was further impaired by oil which was leaking from the engine and spraying on my goggles. This inconvenience I finally removed by getting Sherman to wipe my goggles and keep them clean, a little task which I could not perform as it took both hands to fly the plane. We flew at an average speed of 69 miles per hour, which was good for that time, and after arrival at San Antonio remained in the air an additional

hour for a total endurance of 4 hours and 20 minutes, which set a new American distance and endurance record. Had I known, at the time, the world distance record, which was 249.4 miles, and the endurance record, 434 minutes, I could easily have broken them both on this flight. As it was, had a measured course been laid out around San Antonio, a new world distance record would have been established.

On the first of April Captain Chandler, who had commanded the aviation school from its inception, was relieved from duty and ordered to the Philippines for a tour of foreign service. He was succeeded by Captain A. S. Cowan, from the Signal Corps, then Chief Signal Officer of the Second Division.

Lt. T. DeW. Milling and Lt. Sherman landing at Texas City, Texas after breaking American Duration and Distance Record.

In a few weeks it became apparent that there would be no military operations along the Mexican Border at that time. Everyone wanted to re-establish the school at some location that would be suitable for flying the year around. Excellent reports had come from the Curtiss School at North Island. Finally authority was granted and arrangements made to occupy North Island, and most of the unit and equipment was transferred to that station on June 14th. A detachment, consisting of Kirtland, Graham, and McCall, with 26 enlisted men and two airplanes remained at Texas City for continued service with the Second Division. Lieutenant McCall was killed the next month, flying alone, in a type-C Wright while performing the precision landing requirements for his military aviator rating test. The exact cause was not determined, but was probably due to a stall. This was the major killer of flyers in those days. Lieutenant Graham met with a serious motorcycle accident and was relieved from aviation duty and returned to his regiment. He returned to aviation duty in World War I and remained with the Air Corps until his retirement in 1929.

By July the school at North Island was running smoothly. The officers who had been assigned to the Curtiss airplane and were being trained in the Curtiss school were transferred back into the Army school, and operated under the command of Lieutenant Geiger as a separate unit. Captain Cowan was in command. Goodyear was chief instructor for all Curtiss plane training and I occupied a similar position for all Wright aircraft. Students were being received, reporting at various times, with different states of proficiency. By the last of December, 1913, the overall accomplishments in aviation by the Signal Corps can be summed up about as follows: Since the purchase of the first airplane in 1909, 23 others had been bought, nine had been destroyed in accidents, and 15 remained in service; 11 officers and one non-commissioned had qualified as pilots, and nine students were undergoing instruction. This was a small cadre for meeting the expansion needs for war, — and war clouds were already forming on the European horizon. But while we were short in numbers of trained personnel and in quantity and quality of equipment, we were not too short in experience. We were laying a sound foundation in training technique and operational

procedures. But no one was seeing, at that time, the strategic growth of air weapons to be achieved through a healthy technological focus on that arm.

Today we view, from the vantage point of hindsight, the tremendous though retarded growth of the airplane as a military weapon system. It has been my privilege to see it move forward from the slow, underpowered, kite-like air vehicle in which I began my flying career, to the decisive capabilities of our present Air Power forces. I have seen its roles and missions expand from reconnaissance and observation through the fire power support of surface forces to the air war of World War II. And I sometimes wonder how great our profit might have been, had we been able to give a little more timely recognition, through foresight, to the military potential of air weapons. Certainly earlier and healthier budgetary support would have accelerated its rate of growth. For the conduct of both World Wars the profit from timely provision of a significant strength in the air weapon system should have been incalculably large,—for neither were we acceptably prepared.

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SOME AVIATION "FIRSTS"

1911

While Lt. Benjamin D. Foulois was out in Texas frightening horses of the Cavalry and battling to stay in position in the pilot's seat of the Wright No. 1 against the afternoon Texas gusts, and in general teaching himself to fly, many notable "firsts" were being accomplished during the year 1911.

Today there are many shockers in the horse-racing racket at Tanforan track near San Francisco, but Tanforan received its first real shock way back in 1911 on January 15th, when Lt. Myron S. Crissy dropped a live bomb on a target below while flying in a plane piloted by P. O. Parmalee.

Remember when the C. O. or the First Sergeant would tell you to take cover in small groups in the woods and foliage as protection against being spotted by liaison aircraft? That was one lesson the Army learned early — early in the historical development of the airplane. On January 16th, 1911, Lt. G. E. M. Kelly flew with Walter Brookins in a Wright plane at the tremendous altitude of 2,000 feet, in order to cross the San Bruno Hills in California, while trying to locate ground troops in the first aerial reconnaissance flight ever recorded. No, the troops were not spotted; they had taken cover in small groups in the wooded areas.

Was it a Navy man who made the first airplane landing on a Naval battleship? No! Mr. Eugene Ely, a Curtiss exhibition pilot landed and took off on the afterdeck of the anchored cruiser **Pennsylvania**, on January 18th, 1911, as part of the show for the San Francisco Air Meet.

Inasmuch as the aviation arm was part of the Signal Corps in those days, it might be considered fitting that the Signal Corps was able to develop the first aerial radio transmitter. This transmitter, designed by Lt. Paul W. Beck, was air tested by him at an altitude of 100 feet by transmitting a message to a radio station on Selfridge Field, California, — a distance of one and one-half miles!

In late January of this year we had a "First in the Atlantic!" In what was at that time the longest over-water flight, J. A. D. McCurdy landed about 10 miles short of his destination, Havana, and landed in the water. He had taken off from Key West, Florida. He was picked up by a Navy Torpedo boat. This could be classified, then, as the first successful ditching in the Air Force.

If you thought that amphibious type aircraft are something rather new, consider that Glenn H. Curtiss flew the first amphibious type operation on February 17th, 1911, when he took off on land from the North Island airfield; landed on water beside the battleship **Pennsylvania** in San Diego harbor, was taken aboard by crane, lowered into the water again, and took off on water and landed on land.

Attention statistical-minded airlines personnel! Who was the first seaplane passenger in recorded official history? Lt. T. G. Ellyson of the U. S. Navy flew as a passenger with Glenn H. Curtiss on February 27th, 1911, in his seaplane, and is thereby accorded the honor of having been the first seaplane passenger.

Was New York the first real air-minded city? — or perhaps St. Louis? — or Chicago? — or San Francisco? On February 28th, 1911, Modesto, California inserted a clause in its charter providing for the building and maintenance of municipal airports when needed.

Back in 1911 Congress, in approving the budget for the fiscal year 1912, granted the Army $125,000.00 for its air operations, the first official appropriation for the air arm.

On or about March 31st, 1911, the Missouri National Guard Signal Corps established an air section, and members were taught flight and ballooning principles, — this the first of its type in the time-honored institution, — the National Guard.

A third state revealed an open mind toward aerial activities about this time, when on June 8th, 1911, Connecticut became the first state in the Union to establish a State Air Regulation.

On August 14th, 1911, was established a truly remarkable record for cross-country flying for those days. Harry N. Atwood flew from St. Louis to New York, a distance of 1,155 miles.

Records were being shattered right and left. A few days later on the 18th of August, P. O. Parmalee established a new altitude record of 10,837 feet during an Air Meet held in Chicago. Then on the 20th, two days later at the same Meet, Lincoln Beachey bettered this mark by quite a bit when he got all the way up to 11,642 feet.

On September 4th, 1911, Lt. T. DeWitt Milling became the "first" Army officer to land an airplane at night when he had to set his crate down at the completion of a 160-mile Tri-State race at Boston, by the light of gasoline flares. Incidentally, that race was won by Earle L. Ovington for the monoplane class, and by Lt. Milling for biplanes.

History reveals an aerial rating that is unfamiliar to practically everyone associated with flying — that of Air Mail Pilot. Air Mail Pilot No. 1 — Earle L. Ovington. He was the first air mail carrier to cover a set route from an established post office — Nassau Boulevard, New York to Mineola, New York. This happened on September 23rd, 1911, and he was granted this rating by the Postmaster General.

What was the official endurance record in 1911? 1 hour, 54 minutes, and 42 seconds. This record was established by Lt. T. D. Milling in a Wright plane at Nassau Boulevard, New York, on September 26th, 1911.

1912

Except for the relatively modern era of supersonic aircraft and nuclear weapons, it had been almost axiomatic that the military in the field of aviation would lag behind the civilian. Back in 1912, a short time after the emergence of aviation from the cradle, this fact was especially true, and remained irrefutably true for a succession of decades. This can be accepted as logical when considering that the military minds of the times were firmly rooted to the ground in terms of Infantry and Cavalry, and could not adequately cope with the airplane and its three dimensional capabilities. On 25 January 1912, Lt. Henry H. Arnold set a military record for altitude flying when he flew as high as 4,674 feet, in a flight which lasted 59 minutes, at the Augusta Aviation School in Augusta, Georgia. Five months earlier, on 18 August, 1911, at Chicago, Lincoln Beachey, a civilian, had established an all-time altitude record of 11,642 feet.

Strangely enough, the wings of the rated pilot as it is today, has undergone a relatively simple evolution and process of modification. The original badge entitled "Military Aviator" was first given official recognition on 23 February, 1912, in War

Department Bulletin No. 2. This first badge was a realistic eagle with wings outspread, the Signal Corps flags beneath each wing, and all suspended from two points from a rectangular metal piece bearing the name, "Military Aviator." The whole thing was gold-plated. When compared to the modern wings, this one was the most radically different. In 1918 and 1921 other changes were made giving it more streamlined features. Capt. Chandler, Lt. Arnold, and Lt. Milling were the first to qualify as "Military Aviators."

One of the very first foreign Flying Schools was opened by the United States in the Philippines. This school was opened under the guidance of Lt. Frank P. Lahm at Fort McKinley, near Manila, on 11 March, 1912. Lt. Lahm had two volunteer students at the time, Lt. Moss L. Love and Cpl. Vernon L. Burge, who was the first enlisted man taught to fly in the service, and who later became a commissioned officer in the Air Corps.

The length of duration that an aircraft could stay aloft grew longer and longer with each succeeding model. On 24 May, Lt. Paul W. Beck set a new unofficial American duration record of 4 hours, 23 minutes, and 15 seconds in his airplane, **Miss Columbia**, at Mineola, Long Island, New York.

It was about this time that military aviators began having illusions of grandeur about the importance of the airplane in future wars. Encouraged by reporters who almost daily covered the Flying Schools of the time, (because any event on flying was newsworthy then), some flyers even invisioned entire battles being fought in the air. On 7 June, 1912, Capt. Charles deForrest Chandler with Lt. T. DeWitt Milling, fired from a Wright B airplane a machine gun, of the ground type, designed by and tested by Col. Isaac N. Lewis. However, the young fledglings had their sprouting wings cropped pretty close in short order when they were tactfully reminded by War Department spokesmen that Army airplanes were intended for reconnaissance only!

On 21 June, 1912, Tiny Broadwick made herself a bit of history by becoming the first woman ever to make a parachute jump from an airplane. She jumped from Glenn L. Martin's airplane near Los Angeles, California. (Glenn L. Martin at that time was in the process of designing and building aircraft.)

On 10 August, 1912, Lts. B. D. Foulois and T. D. Milling each piloted a Wright plane in taking part in the Army maneuvers. This marked the first time in the history of the Signal Corps that planes participated in Army maneuvers.

The early history of aviation was not without its share of grief and hardships. On 28 September, 1912, Frank S. Scott, then a Corporal in the U. S. Army, received the dubious honor of being the first enlisted man to be killed in an airplane accident in the Army. He was riding with Lt. L. C. Rockwell (also killed) at College Park, Maryland.

If you "mosquito" pilots of the Korean War thought you had a novel job doing Artillery spotting, reflect on history for a moment. Lts. Henry H. Arnold and Follett Bradley became known as the first Artillery spotters from airplanes when, on 5 November, 1912, at Fort Riley, Kansas, they helped adjust artillery fire from their airplane.

Even in those days a few people tried to vision through foresight. President Howard Taft appointed a commission on 19 December, 1912, to report to Congress on a national aerodynamic laboratory. But the bill to legalize the commission was not passed by Congress.

1913

New England baked beans probably have never received greater notoriety. Baked Beans comprised the first bundle of cargo which was delivered as Air Parcel Post, and this was back in 1913, on January 13th. Harry M. Jones, in a Wright B flyer, covered a route from Boston to New York carrying the beans for the Governors along the way.

A very long time was required to make the Air Force a separate arm of the military services, as we all know. As a matter of fact, it had been 34 years since an attempt was first made to separate the air arm. This first attempt was on the part of Representative James Hay of West Virginia, when he introduced H. R. 29728, which proposed a separate Aviation Corps. The bill failed to pass, largely through the influence and instrumentation of several of the officers then in the Aviation section of the Signal Corps. This happened on 11 February, 1913.

Visionary men were not to be held down, however, in spite of the hardships and handicaps imposed when trying to overcome conventionalism and the status quo. One such brilliant example of foresight was the Langley Field Aerodynamic Laboratory project which was inaugurated by the appointment for an advisory committee on 13 February, 1913, by the regents of the Smithsonian Institute.

In recognition of the special hazards and particular dangers of flying, Congress authorized the first flying pay on 2 March, 1913. This authorization provided for 35 percent over base pay for officers on aviation duty.

Of course, the finished product could not compare with the wonderful photo maps of our modern flying cameras, but it was a start in the right direction nevertheless, when Lt. W. C. Sherman, riding with Lt. T. D. Milling on a nonstop cross-country flight from San Antonio to Texas City, Texas, made the first aerial map from a plane on 31 March, 1913. It was, as a matter of fact, quite a legible production.

In a little more than a year's time, the Army altitude record for flying was almost doubled, when on 13 April, 1913, at San Diego, California, Lt. S. H. McLeary set a new Army altitude record of 8,400 feet in a Curtiss plane. This was 3,726 feet higher than the record established by Lt. H. H. Arnold the year before.

The Federal practice of registering and licensing aircraft first came about as the result of a bill introduced by Mr. Boise Penrose in the Senate on 21 April, 1913.

Pictures were taken from the air to prove it. On 27 April, 1913, cameraman Robert A. Duhem, riding as passenger with Robert C. Fowler, Flew from Panama City, Canal Zone, to Cristobal, from ocean to ocean, across the Isthmus of Panama, nonstop, in 57 minutes. This was a memorable occasion because it was the first seaplane flight in Panama, and the first passenger-carrying flight in Central America.

The first of a series of events which were later to set off a powder keg of heated discussions and animosities was inaugurated by Didier Masson who, while flying for Obregon, began a series of air bombing raids against Mexican Federal gunboats in the Guaymas Bay in the Gulf of California, on 10 May, 1913.

A new duration and distance record for two men was established by Lts. T. D. Milling and W. C. Sherman when they flew 220 miles from Texas City to San Antonio, and remained aloft for 4 hours and 22 minutes, on 18 May, 1913.

The heyday of pleasure flying around the Great Lakes area might have had its inception the day that Beckwith Havens established the first long-distance cruise in a flying boat, when he flew 885 miles on the Great Lakes on 8 July, 1913.

Back in the good old days it seems that Seattle, Washington, during midsummer, celebrated a festival known as the "Seattle Potlach Celebration." In the year 1913, this celebration was memorable because of its contribution to the "firsts" of Aviation history. During the last night of the celebration Milton J. Bryant, one of the Bryant brothers, wrote "SP" in fire over the city of Seattle, thus initiating the practice which came to be known as "Skywriting" on July 19th.

A significant innovation in military flying occurred during the latter part of November or early part of December, 1913. Phil Radar, flying for General Huerta and Dean Ivan Lamb, flying for General Carranza over Neco, Mexico, exchanged a dozen or so pistol shots in what was probably the first recorded aerial dogfight in history. It was the initiation of and forerunner of the modern dogfighting techniques of the last World War.

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PROVOCATIVE VIEWS

By

Orvil A. Anderson

Today the military potential of Air Power is generally accredited with the capability of destroying the civilization we now enjoy. It has in certain thinking areas made war that would utilize the full striking power of this force too horrible to contemplate. Its destructive power has generated the conclusion that there can be no victory in war if this force is fully applied. These views emanate from recognition of the efficient and effective power of nuclear weapons in destroying surface structures against which they may be employed.

This decisive power of air weapons is evaluated in some fields of military thinking as being the direct product of the development of nuclear bombs. Neither reason nor experience supports that evaluation. These same surface structures could be and were destroyed by the orthodox bombs of World War II whenever requisite force was employed against them. There is, however, a significant power difference between these types of bombs. Possessing a lower order of firepower, the weapons of World War II demanded far greater application of force to achieve an equivalent result. But when appropriate force was employed, the destruction achieved was equally decisive.

Adding the nuclear bomb to our arsenal of weapons did not elevate Air Power to decisive force. This strategic capability was reached in World War II before the introduction of atomic warheads. The introduction of the nuclear bomb, however, has so expanded the magnitude of decisive power in the air weapon system that it seemingly transcends the comprehension of orthodox military minds and contributes to frustrating confusion as they struggle to tailor and fit this expanding power into the outmoded patterns of military conflict. The reason is basic to the attitude, approach, and manner in which the air weapon system has been, and is being, appraised in the military field of thinking. If its military worth is to be measured, as it has been measured, from a platform of past experience, current and potential values will never be reached and appropriate employment will never be planned. The impact of progress and resultant change will have outmoded those values. But if man have the capacity and courage to face the future through foresight and reasoned prediction, he will readily sense the fact that evolution and change are features that are ever present in his military problems, — in the features of his weapons, and their employment in war.

In the history of warfare no other weapon system has been initially so revealing in these factors, — evolutionary progress and change, — as the military air arm. At its origin it had as an intrinsic feature the prerogative of initiative in either attack or withdrawal in any action against surface forces. Against this weapon system surface forces could only defend. At its inception this tactical advantage endowed this new military arm with the power potential of decisive force. True, it demanded a healthy technological focus on the growth of its military features to acceptably expand this potential power into actual worth. But whether this technological support were fostered or fettered, with the passage of time, the air arm had to grow to the dimensions of decisive military force. An inquisitive technology oriented to the intrinsic features of the weapon would with time, insure it. It was inevitable that one of the military powers of the world would sense, to some degree, the potential of this new weapon system and exploit it. If technology were fostered and focused on the combat potential of the airplane, the timely provision of significant force would be its profit. If it were fettered with limiting roles and missions that deterred its growth and received only the technological support of a competitive industry focused

on profit and loss, the delay in reaching significant military stature was inevitable, and that delay could only be measured in terms of excess hazard and cost. It is now a matter of historical record that fettering factors were ever present in the growth of the air arm. Its growth was slow and it was consistently assigned to limiting roles and missions as an ancillary arm. This supporting role dictated the design of weapons, organizational structure and employment in the last World War. This organizational structure, as well as roles and missions, are the dominating features of Air Power today.

The power which is widely attributed to the present air arm when equipped with its nuclear weapons clearly outmode these organizational and mission features. If it have the power to destroy a nation, if that should be its mission, certainly it possesses the capability of successfully performing a lesser task. The defeat of opposing military force could be classed as such a task.

If an enemy have a concurrent power in its own air weapon system to destroy this nation in terms of its civilization, culture and way of life, reason would demand that our strategy be focused on effectively countering this national threat and that such of our military forces as can be profitably employed be organized for, and committed to, that overriding strategic objective. This would dictate major modification in our present military structure and its missions.

If, however, it were possible to outlaw the nuclear bomb on the grounds that it is a superhorrible weapon that transcends man's tolerance, even in contemplation, it might be easier to defend present military organization and missions. But this would still retain distortion of evolutionary fact. Air Power, with or without the nuclear bomb, has already reached the dimensions of decisive military force. Air Power must win the air war if a nation is to survive. If it fail to win command of the air while that achievement still has strategic meaning, surface forces, either on land or on the water, will never retrieve that loss. This dominating military feature should dictate military structure. But it appears that we must wait a little longer to see that recognition emerge from the roles-and-missions battle that is currently absorbing military thought.

But why do we single out a weapon and brand it horrible? Do we infer that other weapons are not? Do we assign a humane feature to the bayonet, the trench mortar, the napalm bomb? Reason, again, will not support it. Weapons of war that maim and kill should all be classed as horrible, and they all demand a lot of mental conditioning before they can be subjected to meditative contemplation without an adverse reaction. True, it will take a lot of bayonet killings to match an atom bomb, but where strategic objective is to be reached a lot of killings is demanded.

But do we want to fight a "blood bath" type of war, — fought to major degree with man-killing weapons? Do we want to pit our limited manpower resources against the almost limitless horde that would oppose? Would we be moral in relegating the one weapon system which can give, as a minimum, parity with the opposition, — and that in the decisive category of conflict, — and substitute a major surface action in which we would, with certainty, face staggering odds? Let reason give the answers.

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